

1 / 1 2

SEQUENCE LISTING

<110> National Agricultural Research Organization

<120> Nucleic acids encoding mirafiori lettuce viral proteins and
utilization thereof.

<130> ARO-A0202P

<150> JP 2002-209805

<151> 2002-07-18

<160> 6

<170> PatentIn Ver. 2.1

<210> 1

<211> 1514

<212> DNA

<213> mirafiori lettuce virus

<220>

<221> CDS

<222> (87).. (1400)

<400> 1

2 / 1 2

gattatTTTT taaaaatata acaagctcat aagaaaacaa ctctccact caaaagtga 60

tcTTTTcaaa gaaaaacaaa gtcaca atg tca gga gta tac aag gtt tcc gga 113

Met Ser Gly Val Tyr Lys Val Ser Gly

1

5

att cag tct atc ttg caa aaa gat gtg act tcc gaa gga gaa aca gct 161

Ile Gln Ser Ile Leu Gln Lys Asp Val Thr Ser Glu Gly Glu Thr Ala

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att cta att tct ctt ggt ctc atg aca aaa gaa gag aag cct gtt cct 209

Ile Leu Ile Ser Leu Gly Leu Met Thr Lys Glu Glu Lys Pro Val Pro

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gca aaa atg gcc atg gtg gca tct gca aaa gca aac tca atc atc ttt 257

Ala Lys Met Ala Met Val Ala Ser Ala Lys Ala Asn Ser Ile Ile Phe

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55

gtt tcg gaa gat ggc tct ttg tct ttt gaa gct cca aaa gaa aca gga 305

Val Ser Glu Asp Gly Ser Leu Ser Phe Glu Ala Pro Lys Glu Thr Gly

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70

gag acc agc aaa cca gga gag aag aaa gag gaa aag aag gta gaa gtg 353

Glu Thr Ser Lys Pro Gly Glu Lys Lys Glu Glu Lys Lys Val Glu Val

75

80

85

3 / 1 2

gga gtc aag ttt cct ttc agc gca gcc aaa gta aag gag cta att gaa 401

Gly Val Lys Phe Pro Phe Ser Ala Ala Lys Val Lys Glu Leu Ile Glu

90

95

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ggg aaa agt ctt act ttg gat cag gac aaa atc caa aaa gtg ctg gaa 449

Gly Lys Ser Leu Thr Leu Asp Gln Asp Lys Ile Gln Lys Val Leu Glu

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gaa tat gtt aag aat ttg cca agg act gct gag act tac aaa cca aaa 497

Glu Tyr Val Lys Asn Leu Pro Arg Thr Ala Glu Thr Tyr Lys Pro Lys

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gag att gag atc aaa tgt ttc aag ggt gtt gac ttc agt ata agc agt 545

Glu Ile Glu Ile Lys Cys Phe Lys Gly Val Asp Phe Ser Ile Ser Ser

140

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ttg ctt tct tca ggg acc aaa atc tta gat gct att ctt tac agt act 593

Leu Leu Ser Ser Gly Thr Lys Ile Leu Asp Ala Ile Leu Tyr Ser Thr

155

160

165

tac aag gat tca gca gag cac aac ttc ata ttt gat gtg aaa gtt cta 641

Tyr Lys Asp Ser Ala Glu His Asn Phe Ile Phe Asp Val Lys Val Leu

170

175

180

185

tct cct gat ttc atc gat agc aag tta ctc gtg aac aac atc gaa aca 689

Ser Pro Asp Phe Ile Asp Ser Lys Leu Leu Val Asn Asn Ile Glu Thr

4 / 1 2

190

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ggc aat cga gca atc aaa gca gct ttc tgt ctt gtt tac aat caa ggt 737

Gly Asn Arg Ala Ile Lys Ala Ala Phe Cys Leu Val Tyr Asn Gln Gly

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gga ttg cca tca aag acg agt gaa gaa cga cca cta tct aag ttt gta 785

Gly Leu Pro Ser Lys Thr Ser Glu Glu Arg Pro Leu Ser Lys Phe Val

220

225

230

aga gaa acg ata ttc cgt gag aaa gat ctc aaa gct aac gag tta tgt 833

Arg Glu Thr Ile Phe Arg Glu Lys Asp Leu Lys Ala Asn Glu Leu Cys

235

240

245

gaa tat ctg tca tca gca gat cct tct ttg ttt cca agt caa gtc ttt 881

Glu Tyr Leu Ser Ser Ala Asp Pro Ser Leu Phe Pro Ser Gln Val Phe

250

255

260

265

ttg aaa atc tca ctt gaa aac ctt cct act gag gtt tca tca cgt tgc 929

Leu Lys Ile Ser Leu Glu Asn Leu Pro Thr Glu Val Ser Ser Arg Cys

270

275

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aag atg tcg att gcg ggc aac aaa gca atg aga tat gca ctc tta gct 977

Lys Met Ser Ile Ala Gly Asn Lys Ala Met Arg Tyr Ala Leu Leu Ala

285

290

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caa aag ttt gac aaa gat gaa att cca gtt cca aca gaa gtg aat.cct 1025

Gln Lys Phe Asp Lys Asp Glu Ile Pro Val Pro Thr Glu Val Asn Pro

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aca act agc tca gaa tac atg cag aaa aag gag aaa ata gaa aaa gca 1073

Thr Thr Ser Ser Glu Tyr Met Gln Lys Lys Glu Lys Ile Glu Lys Ala

315

320

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aaa aag ata gtt gat gtt cta tgt tct ctt gct tct gac ttc cag gca 1121

Lys Lys Ile Val Asp Val Leu Cys Ser Leu Ala Ser Asp Phe Gln Ala

330

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340

345

caa gtg aaa atg cat cct ctc tcc cct gag aga tca tcg agg aag aat 1169

Gln Val Lys Met His Pro Leu Ser Pro Glu Arg Ser Ser Arg Lys Asn

350

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360

ttc act ctg caa ttg act tct gca att gtt act tca ctt tcc tac aaa 1217

Phe Thr Leu Gln Leu Thr Ser Ala Ile Val Thr Ser Leu Ser Tyr Lys

365

370

375

ggg agg tta gac atg aga aaa gca atc gaa gag aaa aag ata gag gct 1265

Gly Arg Leu Asp Met Arg Lys Ala Ile Glu Glu Lys Lys Ile Glu Ala

380

385

390

ttc aaa aga gat gaa aat ata ttt gga agg tta aat gct ctt gga caa 1313

Phe Lys Arg Asp Glu Asn Ile Phe Gly Arg Leu Asn Ala Leu Gly Gln

6 / 1 2

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ccc acg ttt cct gtt ctg act aac gca gat gct gac ttt tct gaa ttg 1361

Pro Thr Phe Pro Val Leu Thr Asn Ala Asp Ala Asp Phe Ser Glu Leu

410

415

420

425

tca gtt gag gcc gtg aag aca gct tac gga aag aaa tga gggcagaatc 1410

Ser Val Glu Ala Val Lys Thr Ala Tyr Gly Lys Lys

430

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ggagtgaata gtgaagaatg tggaattgtg gacagatttg cttttttccg cttatccttt 1470

gcgataggga gtatgtgaac tgatagtttt aataaaaaac tatc 1514

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<211> 437

<212> PRT

<213> mirafiori lettuce virus

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Met Ser Gly Val Tyr Lys Val Ser Gly Ile Gln Ser Ile Leu Gln Lys

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Asp Val Thr Ser Glu Gly Glu Thr Ala Ile Leu Ile Ser Leu Gly Leu

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25

30

Met Thr Lys Glu Glu Lys Pro Val Pro Ala Lys Met Ala Met Val Ala

35	40	45
Ser Ala Lys Ala Asn Ser Ile Ile Phe Val Ser Glu Asp Gly Ser Leu		
50	55	60
Ser Phe Glu Ala Pro Lys Glu Thr Gly Glu Thr Ser Lys Pro Gly Glu		
65	70	75
Lys Lys Glu Glu Lys Lys Val Glu Val Gly Val Lys Phe Pro Phe Ser		
85	90	95
Ala Ala Lys Val Lys Glu Leu Ile Glu Gly Lys Ser Leu Thr Leu Asp		
100	105	110
Gln Asp Lys Ile Gln Lys Val Leu Glu Glu Tyr Val Lys Asn Leu Pro		
115	120	125
Arg Thr Ala Glu Thr Tyr Lys Pro Lys Glu Ile Glu Ile Lys Cys Phe		
130	135	140
Lys Gly Val Asp Phe Ser Ile Ser Ser Leu Leu Ser Ser Gly Thr Lys		
145	150	155
Ile Leu Asp Ala Ile Leu Tyr Ser Thr Tyr Lys Asp Ser Ala Glu His		
165	170	175
Asn Phe Ile Phe Asp Val Lys Val Leu Ser Pro Asp Phe Ile Asp Ser		
180	185	190
Lys Leu Leu Val Asn Asn Ile Glu Thr Gly Asn Arg Ala Ile Lys Ala		
195	200	205
Ala Phe Cys Leu Val Tyr Asn Gln Gly Gly Leu Pro Ser Lys Thr Ser		
210	215	220
Glu Glu Arg Pro Leu Ser Lys Phe Val Arg Glu Thr Ile Phe Arg Glu		
225	230	235
Lys Asp Leu Lys Ala Asn Glu Leu Cys Glu Tyr Leu Ser Ser Ala Asp		

8 / 1 2

245	250	255
Pro Ser Leu Phe Pro Ser Gln Val Phe Leu Lys Ile Ser Leu Glu Asn		
260	265	270
Leu Pro Thr Glu Val Ser Ser Arg Cys Lys Met Ser Ile Ala Gly Asn		
275	280	285
Lys Ala Met Arg Tyr Ala Leu Leu Ala Gln Lys Phe Asp Lys Asp Glu		
290	295	300
Ile Pro Val Pro Thr Glu Val Asn Pro Thr Thr Ser Ser Glu Tyr Met		
305	310	315
Gln Lys Lys Glu Lys Ile Glu Lys Ala Lys Lys Ile Val Asp Val Leu		
325	330	335
Cys Ser Leu Ala Ser Asp Phe Gln Ala Gln Val Lys Met His Pro Leu		
340	345	350
Ser Pro Glu Arg Ser Ser Arg Lys Asn Phe Thr Leu Gln Leu Thr Ser		
355	360	365
Ala Ile Val Thr Ser Leu Ser Tyr Lys Gly Arg Leu Asp Met Arg Lys		
370	375	380
Ala Ile Glu Glu Lys Lys Ile Glu Ala Phe Lys Arg Asp Glu Asn Ile		
385	390	395
Phe Gly Arg Leu Asn Ala Leu Gly Gln Pro Thr Phe Pro Val Leu Thr		
405	410	415
Asn Ala Asp Ala Asp Phe Ser Glu Leu Ser Val Glu Ala Val Lys Thr		
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Ala Tyr Gly Lys Lys		
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<210> 3

<211> 6

<212> PRT

<213> mirafiori lettuce virus

<400> 3

Glu Gly Glu Thr Ala Ile

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<210> 4

<211> 6

<212> PRT

<213> mirafiori lettuce virus

<400> 4

Leu Pro Thr Glu Val Ser

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<210> 5

<211> 17

<212> DNA

<213> Artificial Sequence

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<220>

<223> Description of Artificial Sequence:an artificially
synthesized primer sequence

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<221> modified_base

<222> (6)

<223> i

<220>

<221> modified_base

<222> (12)

<223> i

<220>

<221> modified_base

<222> (15)

<223> i

<400> 5

garggngara cngcnat

17

<210> 6

<211> 17

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence:an artificially
synthesized primer sequence

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<221> modified_base

<222> (3)

<223> i

<220>

<221> modified_base

<222> (9)

<223> i

<220>

<221> modified_base

<222> (12)

<223> i

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<221> modified_base

<222> (15)

<223> i

1 2 / 1 2

<400> 6

swnacytcng tnggnar

17